INSTALLATION, OPERATING AND MAINTENANCE INSTRUCTIONS

# KESSEL-lifting station *Aqualift®F* Duo/*XXL SPF 550 KE*
## for wastewater with and without faeces for free-standing installation in rooms protected from frost

### *Aqualift®F Duo/XXL SPF 550 KE*

### Product advantages

- **Drilling surfaces for further connections**
- **Fully automatic operation**
- **Maintenance-friendly PE-tank**
- **User-friendly menu navigation via a 6-line display**

☐ **Installation** ☐ **Commissioning** ☐ **Instruction**

**The installation and service of this unit should be carried out by a licensed professional servicer**

Name/Sign Date Town

Company - Telephone No.

Subject to technical amend-

Edition 10/2010

ID-Nr. 206-830EN

KESSEL

# 1. Safety information

General safety precautions

During installation, operation, maintenance or repairs to the system, please observe the accident prevention regulations, the applicable DIN and VDE standards and guidelines, and also the regulations of the local energy and supply companies.

The systems may not be operated in explosive areas

Electrical hazards

This system contains electrical voltages and controls rotating mechanical parts. Non-observation of the operating instructions could lead to serious damage, injury or even fatal accidents.

The system must be securely disconnected from the mains supply before commencing any work on it. The local master switch and the cut-outs must be turned off, i.e. switch the system to zero-potential and take precautions to ensure it cannot be switched on again. If only cut-outs are available, these must be switched off and a sign attached to prevent third parties from switching the main fuse on again. VDE 0100 applies to all electrical work on the system.

The switchgear and the level control are under voltage and may not be opened. Only electricians may work on the electrical equipment. The term 'electrician' is defined in the VDE 0105.

Steps must be taken to ensure that the electrical cables and all other electrical system parts are in a fully functional condition. If any parts are damaged, the system may not be operated and/or must be immediately shut down.

Risk of burning fingers and hands

The driving engine may become very hot during operation

Risk of injury to fingers and hands

The pumps are equipped with a closed impeller. Therefore work on the pump may only be carried out if the power supply has been disconnected and the rotating parts have stopped rotating.
Take care on sharp edges during maintenance or repair work.

Risk due to heavy weights

The lifting system models with one pump weigh around 45 kg, and with two pumps around 84 kg. The systems may only be lifted or mounted by two persons with appropriate care wearing protective equipment (e.g. protective shoes).
The pumps may only be removed slowly or placed in the pump flange opening by two persons (if suitable precautions to prevent slipping have been taken).

# 1. Safety information

### Health risk

The wastewater system transports wastewater that contains faeces; in turn this faeces may contain harmful substances. Whenever working on the system, always ensure that there is no direct contact between the wastewater and/or soiled system parts and your eyes, mouth or skin. In the event of direct contact, clean the affected part of your body thoroughly and disinfect if necessary. It is also possible that the atmosphere in the tank may be harmful.
Therefore before opening the cleaning aperture (or removing the pump) ensure that the respective room is adequately ventilated or provide for (forced) ventilation during the opening process.

### Noise pollution

When the pump is operated, a noise level is created that may be a nuisance depending on how the pump is installed. If there are maximum noise level stipulations that need to be observed, appropriate measures need to be taken. The sound damping set from KESSEL may also be helpful here.

### Risk of explosion

The inside of the tank is considered to be explosive within the meaning of EN 12050 because the biological digestive process may create flammable gases (hydrogen sulphide, methane gas). Therefore, when unscrewing the pump or the cleaning aperture lid or any other parts, ensure that the room is adequately ventilated or provide for (forced) ventilation during the opening process. Whilst the tank is open, it is forbidden to smoke or carry out any other activities in the respective room that could cause the gas to ignite (e.g. operation of electrical devices without encapsulated motors, metalworking etc.).

# Table of contents


| | | | |
|---|---|---|---|
| 1. Safety information | | | Page 2 |
| 2. General | 2.1 | Application scope | Page 5 |
| | 2.2 | Description of the system | Page 5 |
| 3. Technical data | 3.1 | Aqualift F Duo XXL | Page 6 |
| | 3.2 | Information about safe use in explosive areas | Page 7 |
| 4. Installation and assembly | 4.1 | Notes on the set-up location | Page 9 |
| | 4.2 | Connection of the pipes | Page 9 |
| | 4.3 | Level recording | Page 10 |
| 5. Electrical connections | 5.1 | General information | Page 11 |
| | 5.2 | Assembly of the switchgear | Page 11 |
| | 5.3 | Installation, wiring | Page 11 |
| | 5.4 | Checking the rotation direction of the pump | Page 11 |
| | 5.5 | Connection | Page 12 |
| 6. Commissioning | 6.1 | General information | Page 15 |
| | 6.2 | Pressure discharge pipes | Page 15 |
| | 6.3 | Description of the function | Page 15 |
| | 6.4 | Control unit operation | Page 16 |
| 7. Inspection and maintenance | 7.1 | Information about the pump | Page 19 |
| | 7.2 | Information about the backflow preventer | Page 19 |
| | 7.3 | Information about the electrical switchgear | Page 20 |
| 8. Malfunctions and troubleshooting | 8.1 | General malfunctions | Page 21 |
| | 8.2 | Error messages | Page 22 |
| 9. Spare parts and accessories | | | Page 26 |
| 10. Warranty | | | Page 27 |
| 11. Declaration of conformity | | | Page 28 |
| 12. Handover record | | | Page 29 |

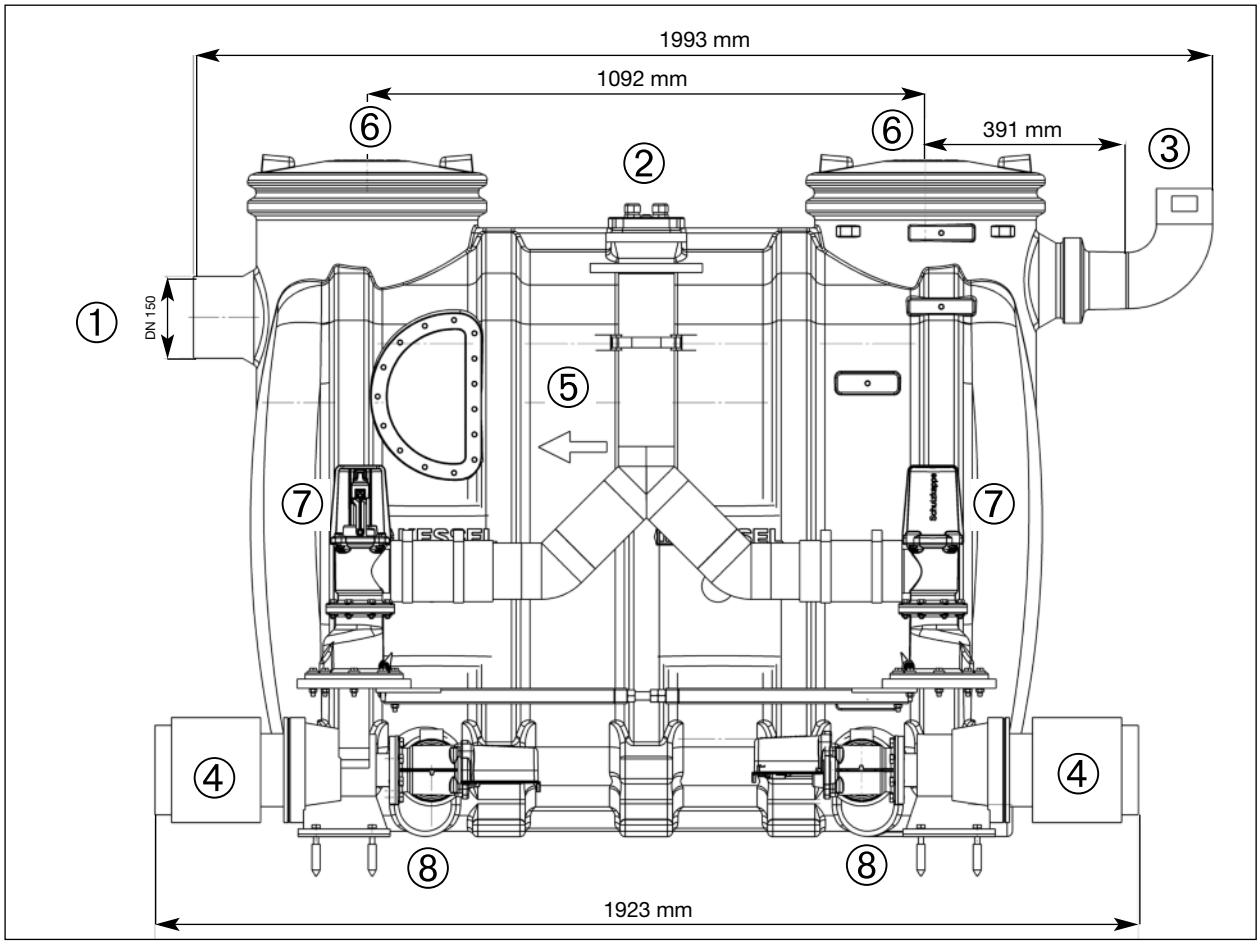
# 2. General

## 2.1 Application scope

The lifting systems pump the wastewater (with and without faeces) that is collected below the drain and local back-up level into the sewers fully automatically in compliance with the stipulations of EN 12056. They may only be used for household wastewater, for example from detached homes and apartment buildings, commercial operations, hotels and restaurants, shops, hospitals, schools or other similar cases. If the incoming flow to the lifting system may not be interrupted during normal operation, the lifting system also needs to be equipped with a second pumping device with the same output level that can switch on automatically if required (double instead of single system).

The KESSEL ***Aqualift® F*** lifting system is designed for free-standing installation in frost-protected rooms. The associated switchgear needs to be installed in a dry room protected from flooding and frost. The pressure lines must be designed to be at least DN 80, the ventilation lines at least DN 50. Abrasive media must be kept away from the pump impeller.
The systems are suitable for permanent wastewater temperatures of up to 35°C. Brief (up to 10 minutes) incoming temperatures of maximum 60°C are allowed.

## 2.2 Description of the Aqualift F Duo XXL system



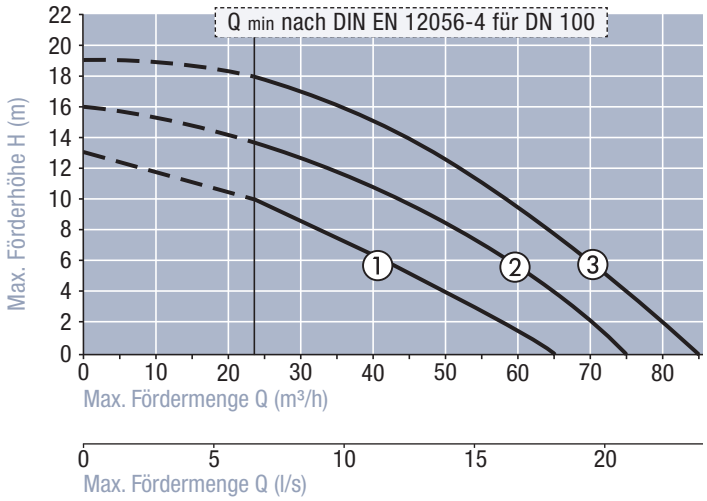

① Intake line DN 150
② Pressure connection DN 100
③ Ventilation DN 100
④ Two wastewater pumps each with a 5 m connection line
⑤ Sump made of polyethylene
⑥ Cleaning aperture
⑦ Blocking device
⑧ Check valve

# 3. Technical data

### 3.1 Aqualift F Duo XXL

Models:
- Aqualift F Duo XXL (double system) 3,3 kW with pressure discharge DN 100,
- Aqualift F Duo XXL (double system) 4,2 kW with pressure discharge DN 100,
- Aqualift F Duo XXL (double system) 5,6 kW with pressure discharge DN 100

**Pumping capacity diagram *Aqualift® F Duo XXL***




① 400 V 3,3 kW
② 400 V 4,0 kW
③ 400 V 5,6 kW

| Typ | SPF 260 KE | SPF 400 KE | SPF 550 KE |
|---|---|---|---|
| Rated output (P2) | 2,6 kW | 3,5 kW | 4,8 kW |
| Power input (P1) | 3,3 kW | 4,2 kW | 5,6 kW |
| Operating voltage | 400 V DS | 400 V DS | 400 V DS |
| Rated frequency | 50 Hz | 50 Hz | 50 Hz |
| Rated current | 6,4 A | 7,9 A | 10,2 A |
| Connection line | 5 m Length, 7 x 1,5 mm² | 5 m Length, 7 x 1,5 mm² | 5 mLength 7 x 1,5 mm² |
| Temperature of pump. mat. | 40 °C | 40 °C | 40 °C |
| Weight (pump) | 30 kg | 30 kg | 31 kg |
| Protection class | IP 68 (24 h /3 mWs) | IP 68 (24 h /3 mWs) | IP 68 (24 h /3 mWs) |
| Operating type | S2<br>30 Min. | S2<br>50 Min. | S2<br>30 Min. |
| Sound level | < 80 db | < 80 db | < 80 db |
| total weight | ca. 200 kg | | |

# 3. Technical data

### 3.2 Information about safe use in explosive areas

**Proper use**

The pump control system serves to operate a dual-pump faeces lifting system. A pressure switch or another type of switch is used to record the level of faeces.

The operating equipment must be installed outside the explosive area.

Classification::

| II (1) GD [EEx ia] IIC |
|---|

(Group II, Category (1)G, associated operating equipment for gas atmosphere)

The specifications of the standard EN 50014:1997 + A1 - A2, EN 50020:2002 are satisfied.

EC-type examination certificate of the Zener barriers

| BAS 01 ATEX 7217 |
|---|

**Identification**

| Ⓔx II (1) G [EEx ia] IIC CE1180 Ta = -20°C .. + 60°C |
|---|

**Operating instructions**
**Installation / commissioning**

The devices may only be built, connected and commissioned by qualified persons. The qualified staff must have expertise regarding ignition protection types, operating equipment regulations and ordinances in explosive areas.
Check if the classification (see above "Identification" and identification on the device) is suitable for the case at hand.

• Allowed ambient temperature range at the place of use:

| 0 ... + 50°C |
|---|

**Type: double system**
Level circuit in ignition protection type Intrinsic safety EEx ia IIC
(terminals OFF, ON1, ON2, ALARM

**Zener barriers MTL 7789+**

Maximum values
Uo = 28 V
Io = 93 mA
Ro= 300
Po = 0,33 W

Co = 0,083 µF
Lo = 16 mH
Lo / Ro= 106 µH /

**Installation / assembly instructions**
- Observe the respective national regulations and provisions
- The respective installation provisions need to be observed
- Also observe the installation and assembly instructions of the non-ATEX relevant operating instructions

Special conditions for safe operation
none

**Maintenance / servicing**

- When the lid is removed, the stated protection class (tightness) is reduced. Check first whether there is a risk associated with a high level of damp, splashwater or any other soiling. In this case the control system should be disconnected from the power supply first. In all cases, steps should be taken to prevent water, fluids or general dirt from penetrating. Only an electrician may open the lid.
- After opening/operation, the lid of the casing must be closed again correctly to guarantee the protection class (tightness).
- The device may not be modified. Repair work is not possible. In the event of a malfunction, please contact the manufacturer.
- If necessary you can order data sheets, EC test examination test certificates, operating instructions and EC Declarations of Conformity from the manufacturer (see cover sheet).

# 3. Technical data

## 3.3 Electrical switchgear

### 3.3.1 General technical data

*Ambient conditions*

| | |
|---|---|
| Approved temperature range: | 0 to 50 °C |
| Approved humidity: | 10 to 80 %<br>Not condensing |
| Maximum operating height: | 2000 m above sea level |

*Power input*
max. approx. 5 VA for simple system
(Electronic without motor)

*Protection class*
class 1

*Protection type*
*IP 30 if fitted correctly.*

### 3.3.2 Power supply

*Main connection*
PE/N/L1/L2/L3 acc. to identification on the terminal block and master switch

*Operating voltage*
400 / 230 V 3~ 50 Hz ± 10% three-phase current (L1=230V AC / 50Hz±10% to supply the electronics power units)

*Required fuse*
max. 25 A C phase (to be provided for on installation side)
Leakage current circuit breaker with 30 mA rated residual current

### 3.3.3 Inputs

- Every pump has TF1
- TF2 bridged (do not remove bridge)
- Level inputs respective
  approx. 24 Vda < 5 mA (without ATEX)
- Level inputs via Zener barriers (with ATEX)

### 3.3.4 Outputs

*Relay "Malfunction"*
Two-way contact; opener, middle contact, closer respectively max. 42 Vac/dc 0.5A for relay “Malfunction” and “Warning”; separate fuse for external voltage.
Caution: Even when the master switch is switched off there is still external voltage on.

*Relay "Warning"*
Two-way contact; opener, middle contact, closer respectively max. 42 Vac/dc 0.5A

*Main supply*
Connect a separate fuse for the external voltage supply

*Motor 1/2 (double system)*

| | | |
|---|---|---|
| Motor 1/2 | PE | mains connection |
| (Spring terminal on circuit board) | | |
| Motor 1/2 | U | Terminal 1/6 |
| Motor 1/2 | V | Terminal 2/7 |
| Motor 1/2 | W | Terminal 3/8 |

# 4. Installation and assembly

The delivery includes the following parts (see section 2.2):
- Sump with all mounted parts
- Electrical switchgear
- Accessories

IMPORTANT:
The electrical switchgear must be stored in a frost-free and dry place. If the system is not connected electrically during installation, the switchgear must be stored properly in the meantime.

CAUTION:
**Risk due to heavy weights.** The lifting systems each weigh approx. 45 kg (single systems) and approx. 84 kg (double system). The parts may only be lifted and mounted taking great care and whilst wearing the correct equipment. If the system is dropped irreparable damage may be caused to the system parts (e.g. pump) or the entire system. This damage is not covered by the warranty.

INSTALLATION SITE:
The KESSEL ***Aqualift® F*** lifting system is designed for free-standing installation in frost-protected rooms. The associated switchgear needs to be installed in a dry room protected from flooding and frost..

### 4.1 Assembly of the sumps

To allow assembly, maintenance and servicing work to be carried out on the lifting systems easily, they always need to be installed so that the lifting system can be easily accessed and that there is at least a free space of 60 cm around the system as stipulated in EN 12056 (all round and on top).

The system must installed horizontally in an appropriate position in the room on sound absorbing material (available from KESSEL as an accessory). The lifting system must be connected to the ground using the supplied brackets, screws and wall plugs to prevent it from slipping or turning.

### 4.2 2 Connection of the pipes

All pipes must be installed so that they can empty on their own. All pipe connections must be designed to be flexible and sound-damping.
A standard plastic sleeve can be pushed over the pipes

**Connections to the drilling surfaces on the side** (for supply line or manual diaphragm pump) by drilling with the hole saw*, insertion of the matching greased seal* and pushing over a plastic pipe (see Fig. A)

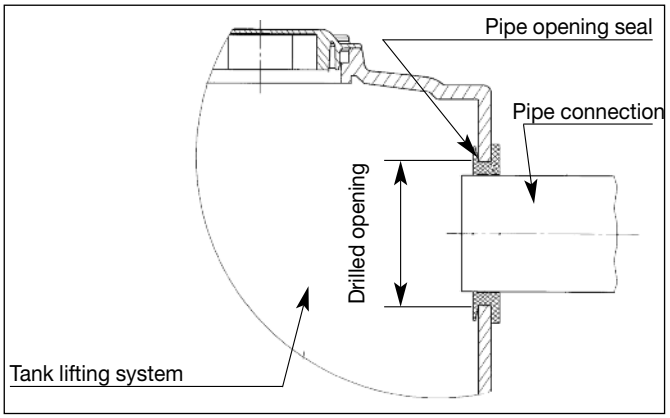



Abb. A

* KESSEL accessory

● Inlet pipe

The inlet pipe must be laid at a gradient to the KESSEL lifting station in accordance with EN 12056 and be routed as straight as possible. Connection is with DN 150

● Ventilation

The ventilation pipe sets up pressure compensation to the fresh air for the air flowing into or out of the system during emptying or filling. Connection is designed with DN 100 (DA 110 mm) and must be routed to above the roof to avoid odour pollution.

● Pressure line

The pressure line used to drain the dirty water into the sewer system must be connected directly to the respective pressure line connection. In compliance with the specifications of EN 12056, the pressure line must be laid above the local back-up level and should be connected to a vented mains pipe or distributing main.
For acoustic decoupling purposes and to avoid the transfer of forces, the supplied rubber braided hose of approx. 4 m in length always needs to be pushed over the pressure pipes at the pressure connection and fixed via a hose clip. The rubber braided hose connection is not a longitudinal force-fit connection. This must be attached on site e.g. using holders.
The pressure line must be fitted (see below) so that the no forces are exerted on to the system and that there is no direct contact with the building (structure-borne noise). No other drainage objects may be attached to the pressure line.
The tightness and strength must be guaranteed even under pressure.
This should be tested when the system is commissioned.
To avoid pressure shocks, the pressure line should not be connected too tightly to the building. If cast iron or steel pressure pipes with low damping properties are used, a pressure shock damper must be fitted into the pressure line if the pumping height exceeds 5 m.
A gate valve needs to be installed in the pressure line on site as stipulated in EN 12056. We recommend using the blocking devices for Mono-systems (Art.No. 28683) and for Duo-systems (Art.No. 28694) from the KESSEL accessories range.
Check valves to prevent pressure shocks for installation in the pressure line are available as accessories:
DN 80 check valve from GG (Art. No.: 206-199
DN 100 check valve from GG (Art.No .206-198)
Backflow preventer (Art.No. 206-200)

### 4.3. Recording the level

#### Setting the float switch

The float switches are fitted and set in the factory. Changing the settings can lead to malfunctions.

Four float switches are required to switch this system (OFF - ON1 - ON2 - ALARM). The alarm level lies approximately at the same height as the lower edge of the supply pipe.

If another switching level is required, the floats need to be set accordingly. However ensure that the alarm float does not switch above the supply pipe and that the OFF float prevents air from being sucked in. Complete flooding of the pump is advisable.

# 5. Electrical connections

CAUTION:
Only qualified electricians may carry out the work described below to the electrical equipment. Before commencing any work on the switchgear, the pump or the level control, the master switch and cut-outs must be switched off and secured against being reconnected.

### 5.1 General information

The strain must be taken from all connected cables by means of screw connections.
Any screw connections that are not used must always be closed correctly.

IMPORTANT:
After the end of the installation work, all the cables connected to the electrical switchgear need to be affixed by suitable means (e.g. cable ties) so that in the 1-error case or if a connection comes undone this does not pose a hazard.

Please observe the national and local safety regulations. Noncompliance could lead to injury. Also this will result in a limitation of liability and warranty exclusion. After the completion of the work, the cover plate and the transparent casing lid must be reattached correctly (contact and splashwater protection).

### 5.2 Assembly of the switchgear

Screw the casing lid tight with a max. force of 1 Nm. Install the supplied switchgear in a frost-free, dry room that is protected against floods and well ventilated. The switchgear is designed for wall mounting on a firm surface. To prevent excessive inner temperatures, ensure there is adequate air circulation. The unit is assembled using 4 screws (diameter 6 mm) in the corners of the casing. The attachment holes can be accessed by opening and folding back the upper lid or removing the lower lid.

### 5.3 IInstallation, wiring

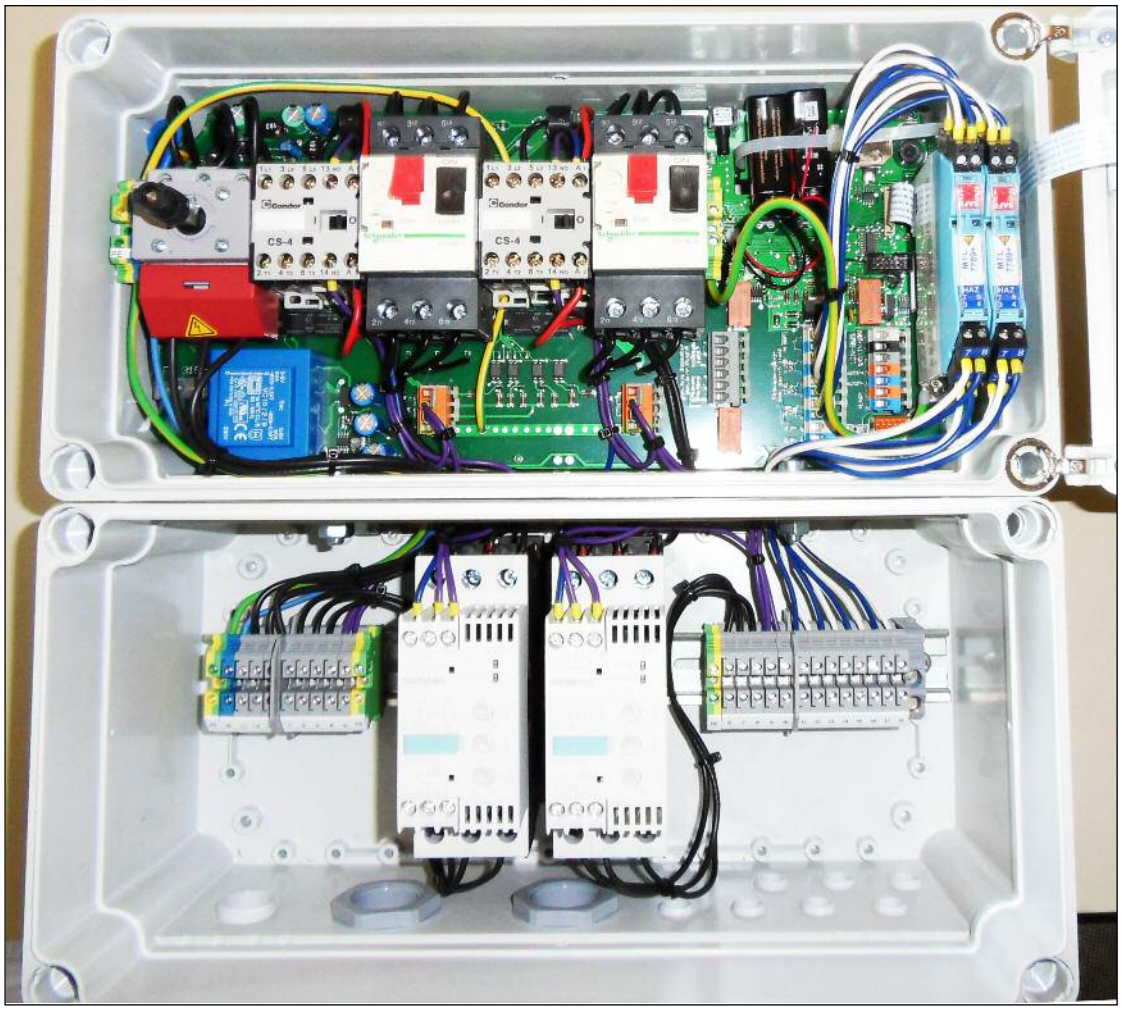
The cables pre-mounted to the pumps and the pressure level switch have a standard length of 5 m. The pump cables may only be extended using a VDE-conform connection.

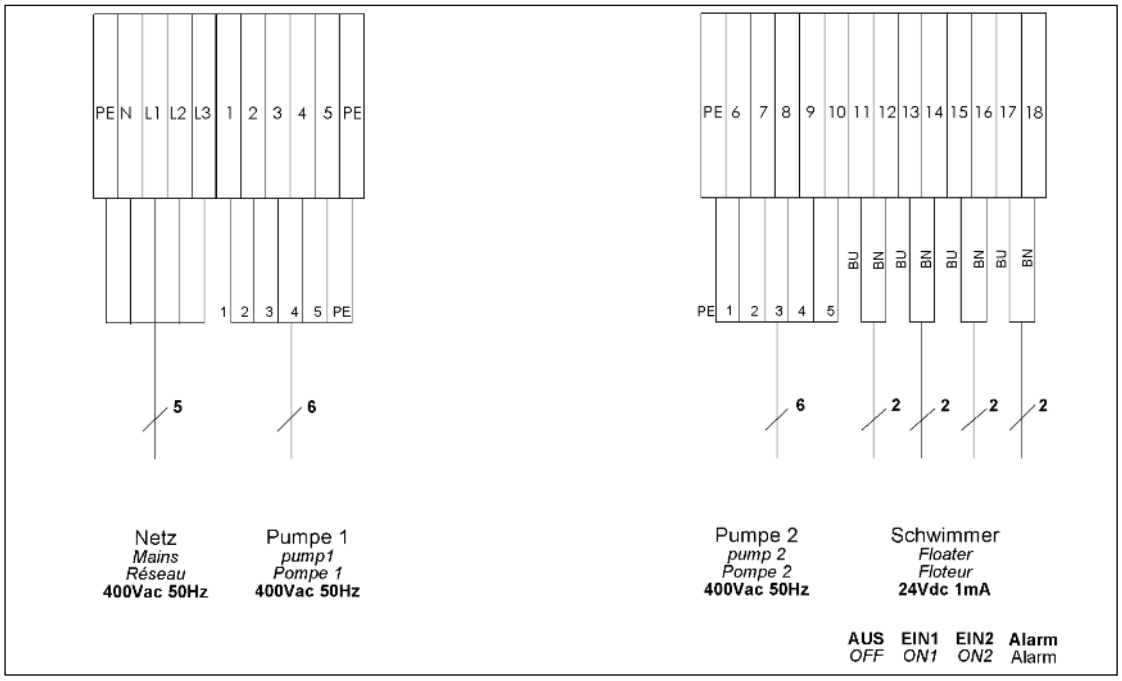
### 5.4 Checks

~~the setting of the motor circuit breaker~~

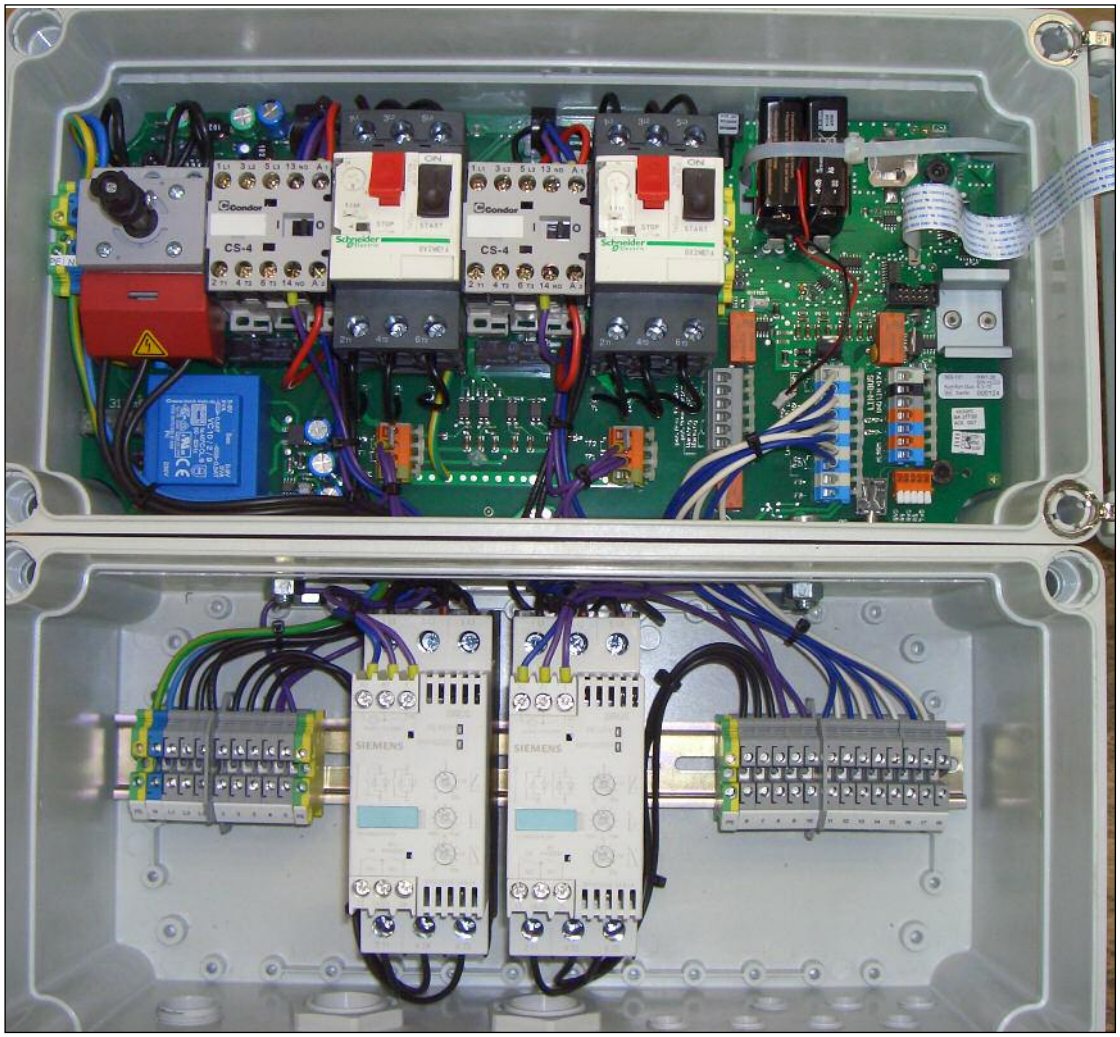
**The motor circuit breaker need to be set to the values for the rated current of the associated pumps as stated in section 3.**

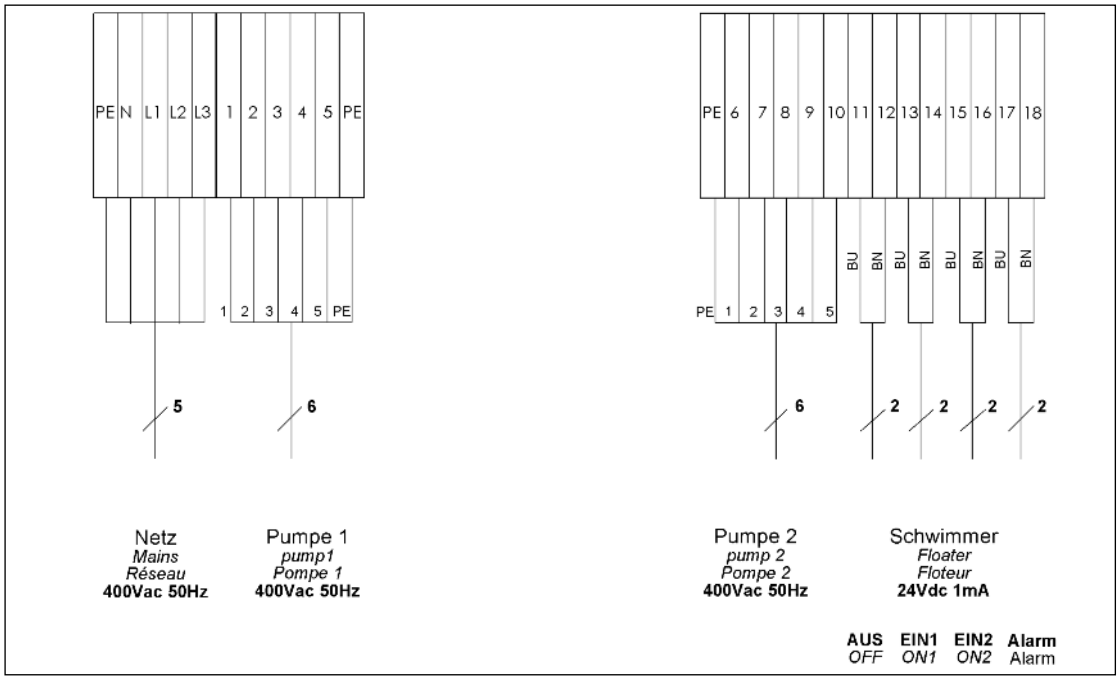
### 5.5 Circuit diagram XXL - SPF 550 KE, Atex





# 5. Electrical connections





# 5. Electrical connections

**Work to be carried out**

| DOUBLE SYSTEM - OBSERVE SAFETY INFORMATION! | |
|---|---|
| Work to be carried out | Description |
| Battery connection | • Both batteries (2 x 9V-Block) must be connected to the circuit board. . |
| Mains connection | • Mains power cable L1 / L2 / L3 / N / PE to terminal left (PE, N, L1, L2, L3).<br>• N and PE always need to be connected.<br>• The stipulated pre-fuses on the installation side may not exceed 25 A C per phase.<br>• If connected wrongly, the control system nay become damaged or be destroyed. |
| Motor supply line | • The motor supply lines 2 x U/V/W need to be connected logically to the terminals 1,2,3 (Pump 1, left) or 6,7,8 (Pump 2, right). The rotational direction of the motors needs to be observed.<br>• The temperature sensors (strand 5 and 6) and the protective earth PE must be connected to the respective pump clamping block. |
| Recording the level | The end of the cables of the float switch are connected to the terminals 11-18 as stated on the circuit diagram (see page 12).. |
| Outlets | • The "Malfunction" and "Warning" messages are each sent via a relay (two-way contact) without "Malfunction" and "Warning<br>• Suppressor. Interference from inductive loads need to be suppressed externally. The idle state (current-free) of the relay is printed onto the circuit board. It means that the "Malfunction" and "Warning" message is switched on.<br>• 42 V dc / 0.5 A |

# 6. Commissioning

## 6.1 General information

**Commissioning**

The commissioning process must be carried out by a qualified person. The availability of this person is the responsibility of the direct supplier of the wastewater lifting system. A test run with water lasting at least two switching cycles is required for the commissioning process. During the test run, steps should be taken to prevent the system running dry. The following need to be tested before, during and after the test run:

a) the electrical cut-out of the wastewater lifting system according to the IEC regulations and local regulations;
b) the rotational direction of the motor;
c) the valves (activation, open position, tightness);
d) the switching and setting of the switching levels in the sump, if not already set by the manufacturer;
e) tightness of the system, fittings and lines;
f) testing of the operating voltage and frequency;
g) function test of the backflow preventers;
h) alarm relay;
i) attachment of the pressure line;
j) motor circuit breaker; tested by temporarily unscrewing two cut-outs (two-phase run);
k) oil level (if there is an oil chamber);
l) control lamps and counters;
m) function test of the manual pump if one has been installed.

The commissioning process must be documented in writing during which important data, such as e.g. the setting of the motor circuit breaker and the data of the operating hour counter, are recorded. The commissioning process may only be carried out by qualified persons. The standard DIN 1986, Part 3 must be observed when commissioning lifting systems.

**Caution**
Before starting the commissioning process, the intake lines and the pump need to be cleared of solids such as metal, sand etc.

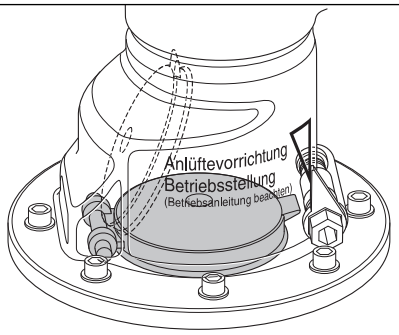
Before starting the commissioning process, the pump must be filled with the pumped liquid up to the level of the venting borehole in the pump casing.
**The pump may not suction in any air!**
After the whole system and all the extra parts, pipes and electrical connections have been installed completely and correctly, the system can be started. All fitted gate valves must be open.
Before commissioning please ensure that the rated voltage and current type stipulated for the system correspond to the rated voltage and current type on site.
Before starting the commissioning process, check the installation/cables again carefully. Is the protective earth effective? Have the relevant standards / guidelines been observed, in particular with regard to the explosive area? Do not start the system if there is any visible damage to the motor, the switchgear or the cables.
Please always observe the safety instructions in Chapter 1 of these instructions.

**IMPORTANT**
Check all screw connections are tight.

## 6.2 Pressure discharge pipes

DAs standard, the pressure discharge pipes of the lifting system are equipped with a check valve and backflow preventer for each pipe. The backflow preventer must always be operational (see Fig. 1).
The flap (dotted line) is only opened by the flow of the pump.

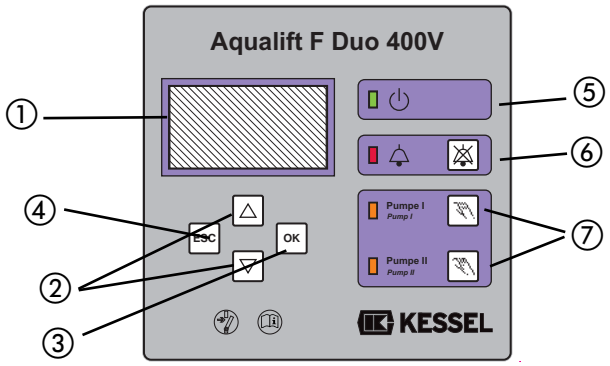
Abb. 1



The system is operational when the POWER-LED shines and if no malfunction (ALARM-LED) are displayed. As the level of (dirty) water in the tank rises, the float recognises the ON level and the pump is switched on. When the pump operates, the level of water in the tank drops so that the OFF level is undercut again. After the end of the after-running period, the pump is switched off. The float symbols in the display show when the respective levels have been reached.

If the current running time of the pump exceeds the configured value of the maximum limit running time, the pump is switched off. At the same time a malfunction is indicated by the orange LED and the relay output "Malfunction". The malfunction (LED and relay) remains saved until the "Alarm" key is pressed.
The pump(s) can be switched on by pressing the test key twice.

### 6.4 Operating the switchgear




① Display/display field

② Movement keys/direction keys

③ Confirmation key/OK-key

④ Return key/ESC-key

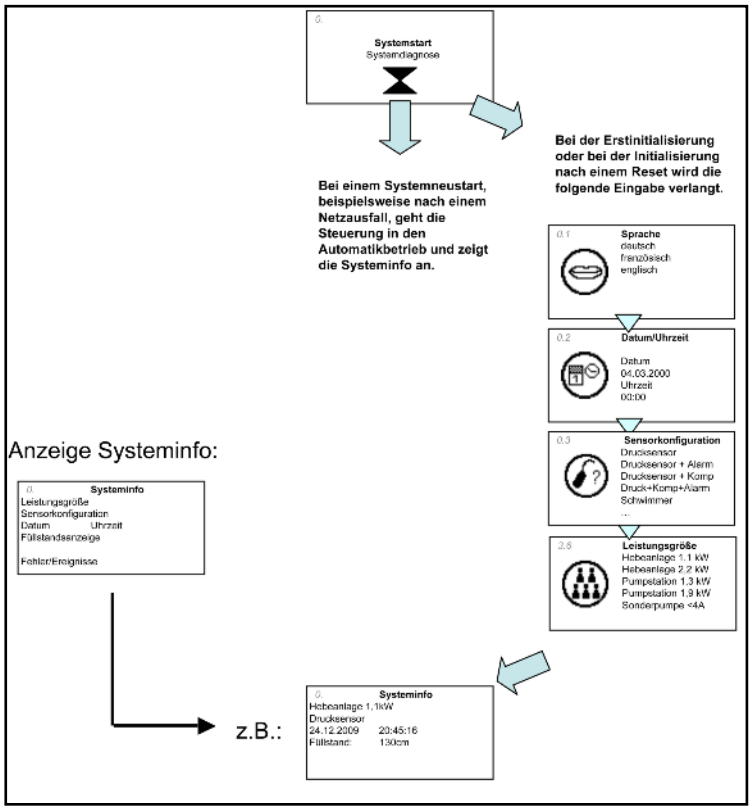
⑤ Power-LED to indicate the system is operational

⑥ Control lamp for alarms

⑦ Activate the pump manually by pressing twice

Comment:
If the lid is lifted, the master switch must be switched off regardless of what the system is currently doing

.




The first time the system is initialised the control device asks for four basic settings. The following appears in the control device display asking for

1. the user language
2. the date and time
3. sensor configuration
4. output parameter

Use the movement keys / direction keys to mark the required setting and then press the confirmation key to save the selected setting in the system memory. As soon as the 4 presettings have been made, the control device loads the program memory and enters the operating mode.
The system is now operational.

# 6. Commissioning

**Menu navigation**
The switchgear menu navigation is divided into the system information and also three separate main menu items. The background lighting is activated by pressing the operating key once.

**OK-key** Jumps to the next lower level

**ESC-key:** Jumps to the next higher level

▲ :
▼ Navigation within a level

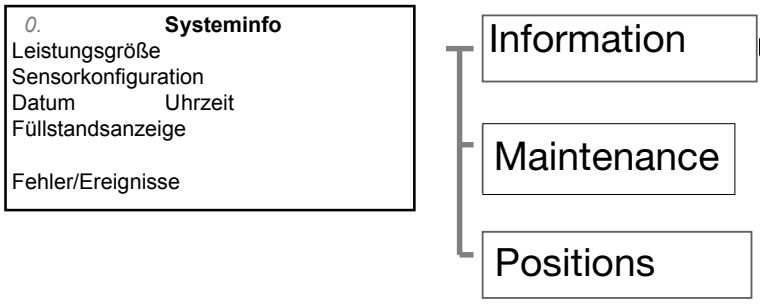
The acoustic signal can be acknowledged by pressing once.
If the error has been rectified, the alarm key can be pressed again to acknowledge the optical error.

If the error has not been rectified, pressing the alarm key again will retrigger the acoustic alarm.

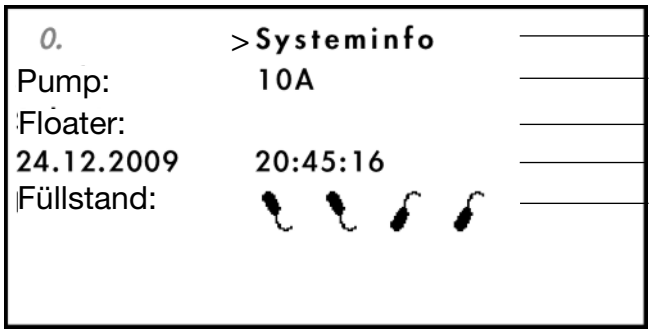
If there is a mains power failure, the system is not operational. The switchgear goes into stand-by mode (battery mode). This is signalised by an acoustic and optical alarm The acoustic alarm can be acknowledged by pressing the alarm key. The stand-by mode is maintained for at least 72 hours. If the battery is discharged, the device automatically switches off. The switchgear can be switched off manually by pressing the alarm key (for more than 5 sec) in stand-by mode.
When the mains power comes on again, the device initialises automatically and is operational again.

Note:
Some menus are protected by a password to ensure the system is used properly.

### 6.4.1 System menu

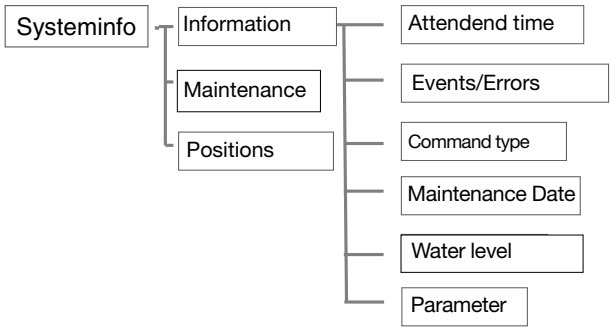



Beispiel:




Display the hierarchy level incl.
Numbering
System type
Control type
Date / time
Current filling level

### 6.4.2 Information menu




**Operating hours**
Displays all running times of the system.

**Events / errors**
Chronological error and event display (see also Chapter 10 "Malfunctions and troubleshooting")
All modifications to the settings are saved here.

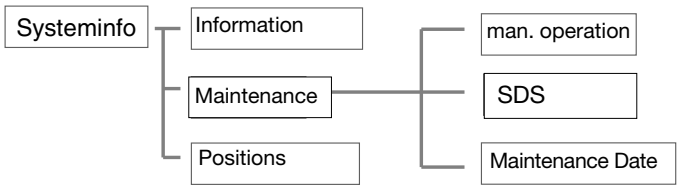
**Control type**
Displays the output parameters and the sensor configuration incl. combinations:
- pressure sensor (pressure)
- alarm
- compressor (comp.)
- float

**Maintenance date**
Shows the next and the last maintenance date.
Note: Dates are only available if they have been filed in the 'Settings' menu by the servicing partner.

**Current measured values**
Displays the mains voltage, current, battery voltage and filling level.

**Parameter**
Displays all the system control parameter settings: Mains-ON delay, height of the dynamic pressure bell, switch-on lock, measuring range, ON1 level.

### 6.4.3 Maintenance menu

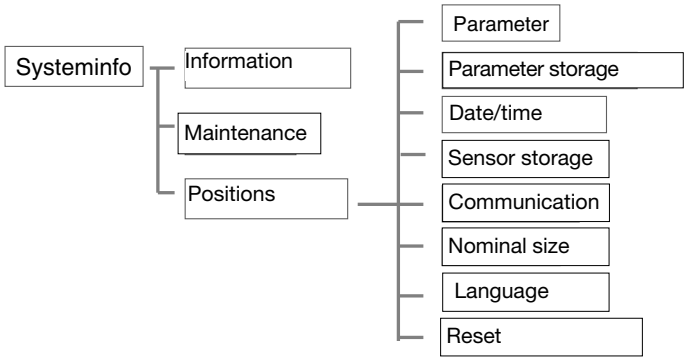



**Manual operation**
In manual mode, the automatic mode is deactivated.

**Self-diagnosis system (SDS)**
System test similar to initialisation.

**Maintenance date**
The next maintenance date is entered by the servicing partner.

### 6.4.4 Settings menu




Only authorised maintenance staff may change the settings. To do this, the KESSEL Customer Service must be contacted for the password.

# 7. Inspection and maintenance

The system must be inspected once a month by the operator with regard to serviceability and leaks by observing a switching cycle.

CAUTION:

Always disconnect the system from the mains supply before servicing! Observe the safety instructions!

Only authorised qualified persons may carry out the inspection and maintenance tasks described below.

Repairs may only be carried out by the manufacturer.

When servicing lifting systems, the DIN 1986, Part 3 must be observed. Maintenance must be carried out regularly by authorised qualified persons..

IMPORTANT:
**All screws may only be tightened with a maximum force of 3 N**

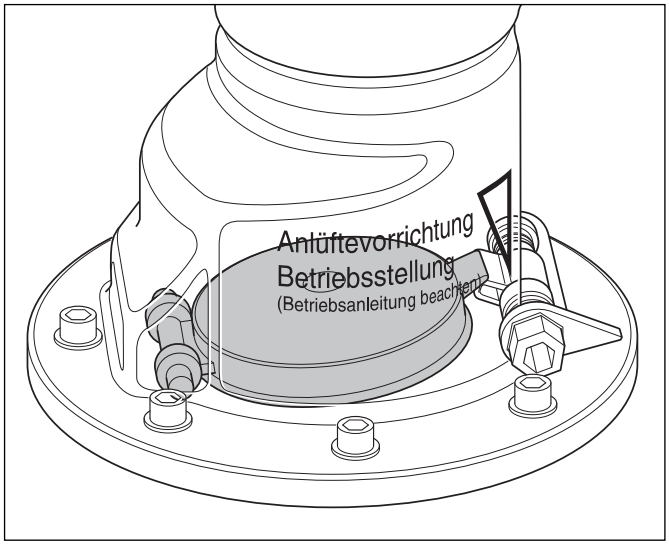
The following tasks must be carried out:
- Visual inspection of the entire system, the pumps and the fittings
- Thorough cleaning of the entire system and the pump
- Inspection of the entire system and pump casing for external damage and visible wear
- Inspection of the pump to ensure it runs smoothly and for wear and deposits
- Inspection of the connection lines for mechanical damage and wear
- Inspection of the seal connections for leaks; in the event of recognisable wear, exchange the seals (e.g. O-ring)
- Check the insulation on the pump motor
- If necessary test the function of the blocking device
- The check valve must be replaced after 2 years service.

### 7.1 Information about the pump

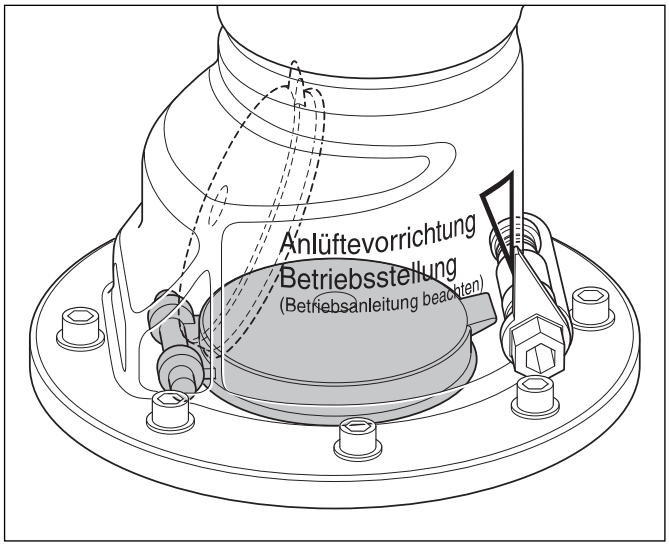
The pump should be inspected at regular intervals. When the operating noises become louder or there are vibrations in the pipe system, the pump casing and impeller need to be checked for any ingrained dirt or wear.
To do this, unscrew the four attachment screws on the motor unit and remove from the pump casing.
When inspecting the pump casing, note that the venting borehole must remain open under all operating conditions.

### 7.2 Information about the backflow preventer

The backflow preventer can be used to completely empty the pressure line by manually lifting the check valve of the lifting system. To do this, turn the flap opener with a size 8 (15 mm) wrench and hold (see Fig. 2) until the pressure line is empty. After this, the flap opener must be returned to its original position or the marked operating setting (see Fig. 3).




Ill. 2




Ill. 3

Note:
When the screw connections on the lower and upper flange of the valve casing are unscrewed, the entire valve casing can be removed for cleaning and maintenance purposes. Of course before this happens the pressure line must be blocked and drained.

### 7.3 Information about the electrical switchgear

- The battery is a wear part and should be checked once a year and exchanged if necessary. Ensure that the replaced battery is disposed of correctly in an environmentally compatible manner. It may only be replaced with a battery of the same type.
- The contactor is a wear part and should be checked once a year and exchanged if necessary. Ensure that the replaced battery is disposed of correctly in an environmentally compatible manner. It ay only be replaced with a battery of the same type.
- After the maintenance work the switchgear lid must be closed again correctly (contact protection!).
- Repairs may only be carried out by the manufacturer.

# 8. Malfunctions and troubleshooting

The following tests and troubleshooting steps may only be undertaken by authorised and qualified persons. If in doubt, please contact your specialist dealer (see stamp on the cover sheet) who installed the system initially.

### 8.1 General malfunctions

| | Malfunction | Caution | Troubleshooting |
|---|---|---|---|
| 1 | Pumps do not start. | Motor circuit breaker has triggered, motor is blocked | Remove the pump; remove the blockage (foreign body) in the impeller or casing |
| | | Motor is labouring | Maintenance / repair by the Customer Service |
| | | 1 or 2 phases have no current<br>Control system fails due to heavy fluctuations of the mains supply | Check the cut-outs and electrical cables<br>Retrofit a battery in the switchgear and inform the power supplier. |
| | | Wrong revolving field | 2 Exchange the phases of the power supply |
| 2 | Pumps are running, alarm level is reached / is displayed. | System is overloaded. | Check if there is a brief excess of wastewater; if necessary refrain from using the drain points temporarily or if possible, drain the wastewater through a different channel |
| | | Pump output too low | • Remove the foreign body from the impeller or casing<br>• Remove the foreign body from the pressure fitting or the pressure pipe<br>• Pumps are worn, arrange for them to be exchanged<br>• Lifting system wrongly designed, clarify with the KESSEL Customer Service |
| | | backflow preventer not in operating position | Bring the backflow preventer into the operating position |
| 3 | Wastewater does not drain, backlog in the lowest drain points | System not switched on | Switch on master switch. |
| | | Electrical power cable to the switchgear without current | Check cut-out. Check power supply |
| | | Level control is not working correctly | Check for soiling, check the switch points and function of the level control |
| | | Supply line to the system is blocked | Clean the supply line |
| | | Intake valve to the system (if there is one) is not open or not compl. opened | Completely open the intake valve |
| | | Wastewater temperature is too high over a longer period of time (15 min.); this limits the suction capacity of the system | Reduce the temperature of the wastewater<br>Check the pump parts and replace if necessary |
| 4 | System sudden becomes loud | Foreign body has damaged parts of the pump | Check the pump parts and replace if necessary |
| | | Foreign body inside the pump | |

# 8. Malfunctions and troubleshooting

| | Störung | Ursache | Abhilfemaßnahme |
|---|---|---|---|
| 5 | Foul smell | Leaks in the lifting system | Remove foreign body; check pump for damage and replace if necessary |
| | Pungent smell | Pump leaks | Check the pump; if necessary arrange for repair or exchange by the Customer Service |
| | | Motor(s) too hot, overloaded | Check the motor and pump run smoothly, check the system for switching errors (in particular the motor circuit breaker) |
| | | | Frequent switching on and off of the system due to high supply quantities, clarify with the KESSEL Customer Service |
| | | Contactor too hot due to switching malfunctions | Check system for switching errors. |
| 7 | System runs too frequently, switches on without reason | Supply quantity is too high due to external water etc. | Determine the cause and the remedy |
| | | The check valve is defective, wastewater runs from the pressure pipe back into the system | Check the check valve (integrated in the pressure discharge pipes of every pump), clean and exchange any damaged parts |
| 8 | System does not switch off or has a variety of malfunctions | Foam is created in the system | Reduce the use of washing detergent or washing-up liquid |
| | | Tanks or the pumps have become covered in grease due to high quantity of grease in the supply material | Clean the entire system, check incoming grease levels |
| | | Ventilation of the level control is blocked | Check if there is a kink in the air hose between the switchgear and level control and if it is installed correctly (even gradient); if necessary correct or exchange |
| | | Level control is soiled; switch points set wrongly or illogically | Dismantle the level control, clean the immersion tube, check the pressure control; check the levels; setting values for the levels |
| 9 | Pumped quantity is too low | Revolving field wrong | Exchange power cores (malfunction message on the switchgear) |
| | | Rotational direction of the pumps is wrong | Check the pump cores are connected correctly |

### 8.2 Error messages

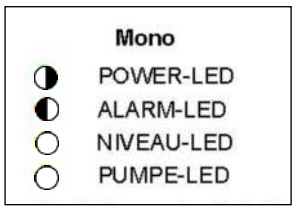
Every malfunction is shown on the display. If several errors occur at the same time, these are shown one after another and can be viewed by scrolling down the display.

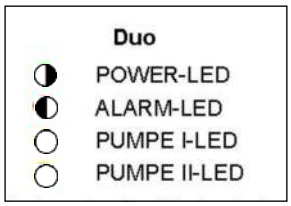
# 8. Malfunctions and troubleshooting

Error messages / troubleshooting

● = lit up ○ = off ◐ =slowing flashing ✣ = fast flashing

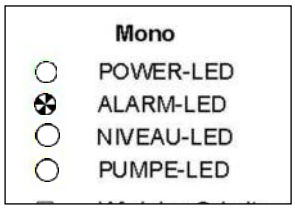
Battery error

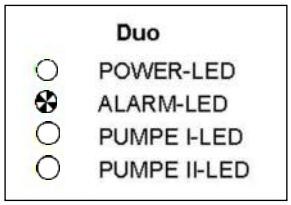



- acknowledge alarm and alarm key
- check if the battery is connected
- exchange discharged battery
- the charging status of the batteries can be tested in menu 1.5.3 (measuring the battery voltage)
- after acknowledging the signal tone, press the alarm key again
  --> switchgear continues to work without the batteries
  --> no protective function in the event of a mains power failure

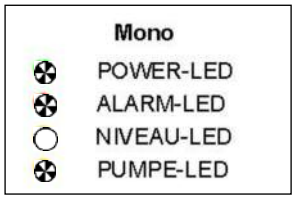
Mains failure (battery mode)



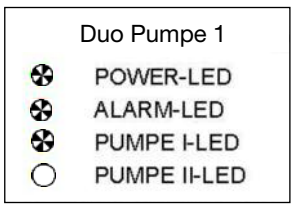

- Check if the mains failure has just affected the room or the entire building
- Check the cut-outs / check the error current circuit breaker
- Check if the mains supply cable is defective
- Check the micro fuse in the switchgear
  (only use a fuse with the same rated value and tripping characteristics).

Motor error



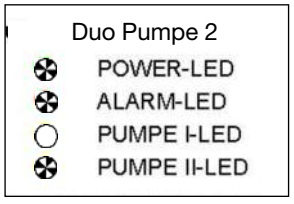

Cause: TF1, TF2, motor circuit breaker

Remedy:
- If display shows “Motor circuit breaker 1/2”
  --> check the motor circuit breaker 1/2




- If display shows “TF1a / TF2a”
  --> the lower winding temperature switch has triggered
  --> resets automatically when the motor cools down

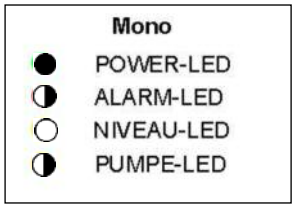
Error message must be acknowledged with the alarm key.
- If display shows “TF1b / TF2b”
  --> for lifting systems, bridge TF2 defective/not installed

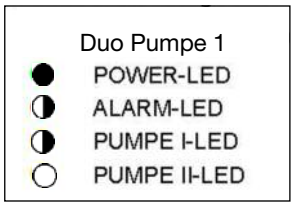


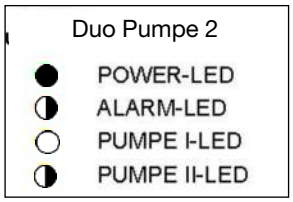

Exchange/install bridge

# 8. Malfunctions and troubleshooting

### Limit running time error / limit running count error



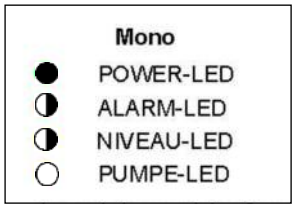



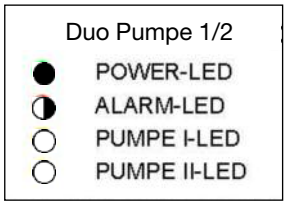




- Limit running count error: Pump is activated more than 20 times in 3 min
  --> Check the air pipe between the immersion tube/immersion bell and switchgear for water inclusions
  --> Check if the immersion tube/immersion bell is blocked
  --> Check intake, check pump capacity

- Limit running time error: Pump runs for longer than 240 min without stopping
  --> Check the air pipe between the immersion tube/immersion bell and switchgear for water inclusions
  --> Check if the immersion tube/immersion bell is blocked
  --> Check intake, check pump capacity

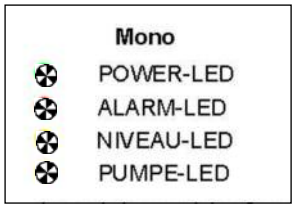
### Sensor error (only for XXL-systems)

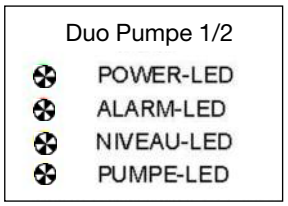



- Level error:
A float indicates a level although no float below has triggered (wrong sequence float)
  --> Check the float cable of the float below
  --> Check the function of the float in the tank (lift)
  --> The pump(s) is/are switched on.
  The switchgear works with the recognised level.

### Revolving field / phase errors



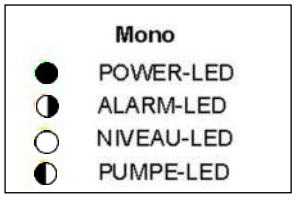

- Revolving field error:
Wrong revolving field when connected to mains Switchgear
  --> exchange 2 phases

- Phase error:
Phase L1 or L2, L3 do not exist
  --> Check connection to switchgear, power cable, cut-outs,

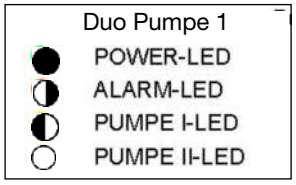
Check error current circuit breaker
--> If L1 fails, the revolving field direction cannot be recognised.
--> If L1 fails, the switchgear goes into battery mode
--> In the case of revolving field errors, the pumps are not switched on in manual or automatic mode

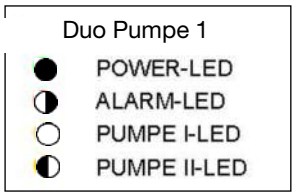
# 8. Malfunctions and troubleshooting

### Relay switching cycles

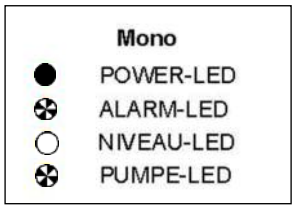



Main contactor has exceeded 100,000 switching cycles
--> can be acknowledged, main contactor does another 1000 switching cycles before a new message is sent
--> Exchange the contactor --> Contact the Customer Service
--> After 100000 switching cycles the relay switching cycle error is repeated after every further 1000 cycles

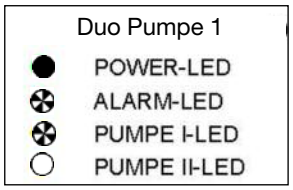


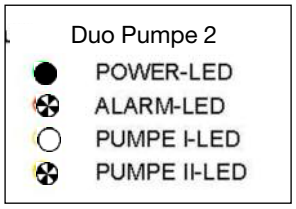




### Relay error

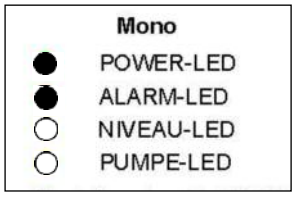



Main contactor no longer switches off
--> Disconnect the switchgear from the mains
--> Exchange the contactor --> Contact the Customer Service

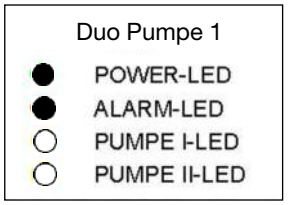



### Alarm level exceeded




Alarm level is achieved by the water level
--> Alarm turns off automatically if the alarm level has been undercut again
--> LED only turns off after it has been acknowledged manually
--> Check intake
--> Check level recording and switch points



# 9. Spare parts and accessories

Accessories

| ***Designation*** | | ***Order-Nr.*** |
|---|---|---|
| Manual diaphragm pump | | 28680 |
| Stopcock for manual diaphragm pump | | 28681 |
| Elastic hose connection with 2 hose clips | DN 40 | 28660 |
| | DN 70 | 28661 |
| | DN 100 | 28663 |
| Flange-hose connection | DN 80 | 28655 |
| | DN 150 | 28658 |
| Gate valve made of plastic for unpressurised installation | DN 100 | 28698 |
| | DN 150 | 28699 |
| Seal for pipe opening | DN 50 | 850114 |
| | DN 70 | 850116 |
| | DN 100 | 850117 |
| | DN 125 | 850118 |
| | DN 150 | 850119 |
| Hole saw DN 50 - DN 150 | | 50100 |
| Battery (1 unit) | | 197-081 |
| Blocking device | DN 100 | 28683 |
| Compressor set for air bubbling | | 28048 |
| Air filter for compressor (28048) | | 363-140 |
| Motorschutzschalter 9-14 Amp. | | 363-186 |
| Motor circuit breaker 6.3-10 Amp. | | 363-151 |
| Level sensor | | 363-138 |
| | | |
| Float for XXL-system | | 185-043 |
| Motor complete 5.6 kW for XXL-system | | 245-406 |
| Switchgear for XXL-system (ATEX) | | 363-196 |
| Switchgear for XXL-system | | 363-197 |

See also KESSEL Catalogue

# 10. Warranty

1. In the case that a KESSEL product is defective, KESSEL has the option of repairing or replacing the product. If the product remains defective after the second attempt to repair or replace the product or it is economically unfeasible to repair or replace the product, the customer has the right to cancel the order / contract or reduce payment accordingly. KESSEL must be notified immediately in writing of defects in a product. In the case that the defect is not visible or difficult to detect, KESSEL must be notified immediately in writing of the defect as soon as it is discovered. If the product is repaired or replaced, the newly repaired or replaced product shall receive a new warranty identical to that which the original (defective) product was granted. The term defective product refers only to the product or part needing repair or replacement and not necessarily to the entire product or unit. KESSEL products are warranted for a period of 24 month. This warranty period begins on the day the product is shipped form KESSEL to its customer. The warranty only applies to newly manufactured products. Additional information can be found in section 377 of the HGB.

   In addition to the standard warranty, KESSEL offers an additional 20 year warranty on the polymer bodies of class I / II fuel separators, grease separators, inspection chambers, wastewater treatment systems and rainwater storage tanks. This additional warranty applies to the watertightness, usability and structural soundness of the product.
   A requirement of this additional warranty is that the product is properly installed and operated in accordance with the valid installation and user's manual as well as the corresponding norms / regulations.

2. Wear and tear on a product will not be considered a defect. Problems with products resulting from improper installation, handling or maintenance will also be considered a defect.

   **Note:** Only the manufacturer may open sealed components or screw connections. Otherwise, the warranty may become null and void

01.06.2010

CE

KESSEL

# EU-KONFORMITÄTSERKLÄRUNG
## EC declaration of conformity/ Déclaration CE de conformité

Nach der Maschinenrichtlinie 2006/42/EG, der Niederspannungsrichtlinie 2006/95/EG,
Richtlinie der elektromagnetischen Verträglichkeit 89/336/EWG.
According to the Machine Guidelines 2006/42/EG, the Low Voltage Guidelines 2006/95/EG,
Electromagnetism Guidelines 89/336/EEC.
Selon les directives mécaniques 2006/42/EG, les directives de basse tension 2006/95/EG,
les directives pour la compatibilité électromagnétique 89/336/EEC

**KESSEL AG**
**Bahnhofstraße 31**
**D-85101 Lenting**

erklären wir, / we declare, / nous déclarons,

dass das Produkt/ that the product/ que le produit

**KESSEL- Hebeanlage *Aqualift® F***
**für fäkalienhaltiges und fäkalienfreies Abwasser zur freien Aufstellung in frostgeschützten Räumen**

**KESSEL *Aqualift® F* Lifting Station for wastewater with or without sewage for above ground installation in weather protected areas.**

**Poste de relevage *Aqualift® F* KESSEL**
**pour eaux usées et eaux vannes pour une installation en local à l'abri du gel**

den folgenden Normen entspricht:/ is in agreement with/ est en accord avec:

**EN 12050-1, EN 12056-4, EN 55082-2, EN 55014, EN 292, EN 55011, EN 60335**

Lenting, den 23.2.2010

M. Rinckens
Leiter Innovationsmanagement / Dokumentationsverantwortlicher
Innovation Management Manager / Responsible for Documentation
Responsable du management pour innovation et de la documentation

E. Thiemt
Vorstand
Managing Board
Conseil d´administration

# Notice

# Important contacts / Info

Separator Type: _____

Day / Hour _____

Project description / Building services

supervisor _____

Address _____

Telephone / Fax _____

Builder _____

Address _____

Telephone / Fax _____

Planner _____

Address _____

Telephone / Fax _____

Contracted plumbing company _____

Address _____

Telephone / Fax _____

Commissioning no. KESSEL

System operator / owner _____

Address _____

Telephone / Fax _____

Other remarks _____

_____

_____

_____

The system operator, and those responsible, were present during the commissioning of this system.

| | | |
|---|---|---|
| _____ | _____ | _____ |
| Place and Date | Signature Builder | Unterschrift Anlagenbetreiber |

KESSEL

# Handover-Ceritficate

## **Handover certificate** (copy for the company carrying out the installation)

❑ The initial operation and instruction was carried out in the presence of the person authorised to perform the acceptance and the system operator.

❑ The system operator/person authorised to perform the acceptance was informed about the obligation to service the product according to the enclosed operating instructions.

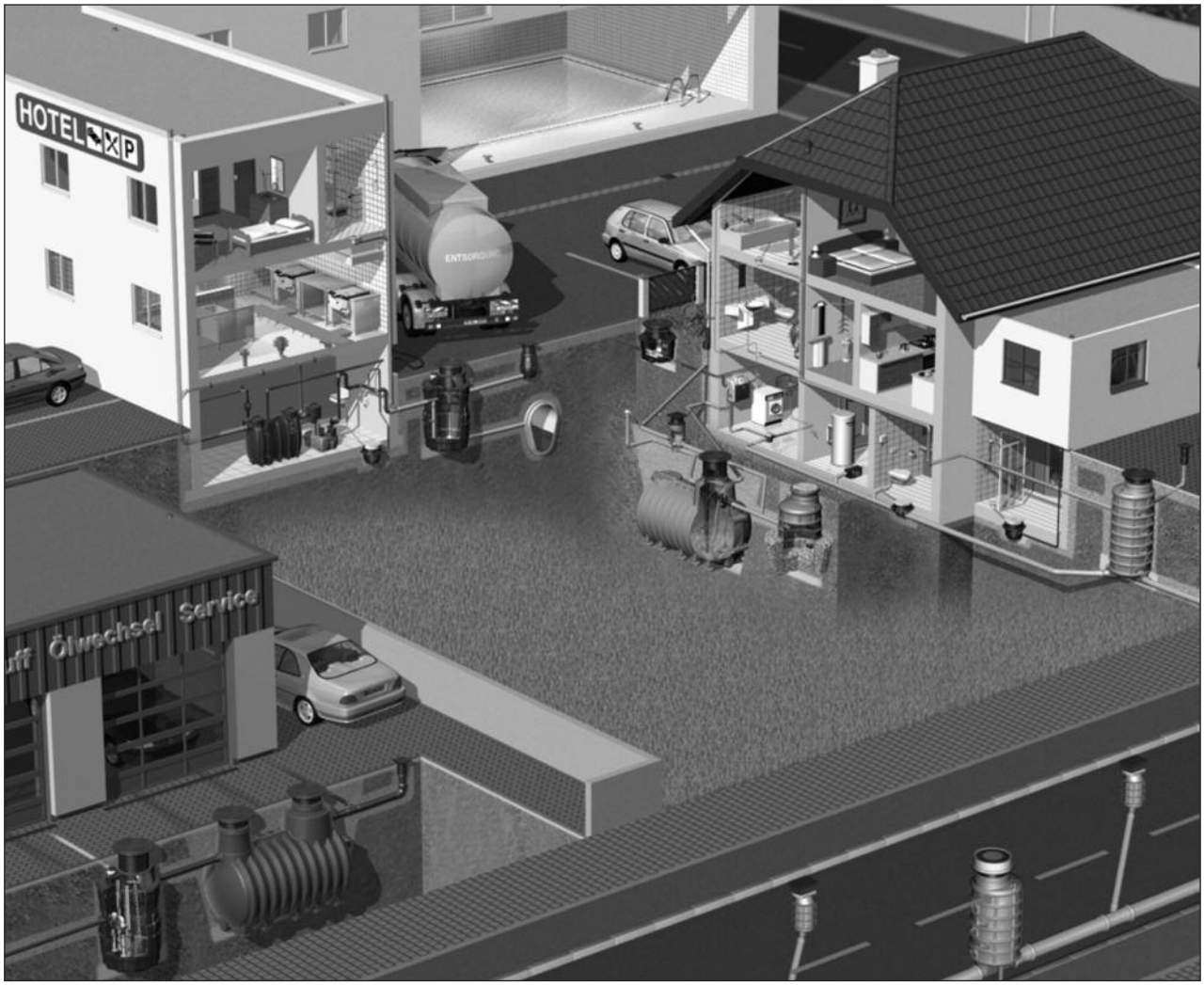
❑ Initial operation and instruction were not carried out.

The client/ person responsible for initial operation was handed the following components and/or product components

Initial operation and instruction is being carried out by (company, address, contact, phone)

The exact coordination of the dates for initial operation/instruction is being carried out by the system operator and person responsible for initial operation.

| Place, date | Signature of person authorised to perform acceptance | Signature of system operator | Signature of the company carrying out the installation work |
|---|---|---|---|




- ❑ Backwater protection
- ❑ Lifting Stations and pumps
- ❑ Drains and shower channels
- ❑ Separators
  - -Grease Separators
  - -Oil-/Fuel-/Coalescence Separators
  - -Starch Separators
  - -Sediment Separators
- ❑ Septic Systems
- ❑ Inspection Chambers
- ❑ Rainwater Management Systems

KESSEL